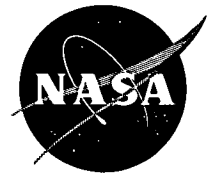


NASA TECH BRIEF



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Radiant Heating Concept Efficient for Light-Transmitting Windows

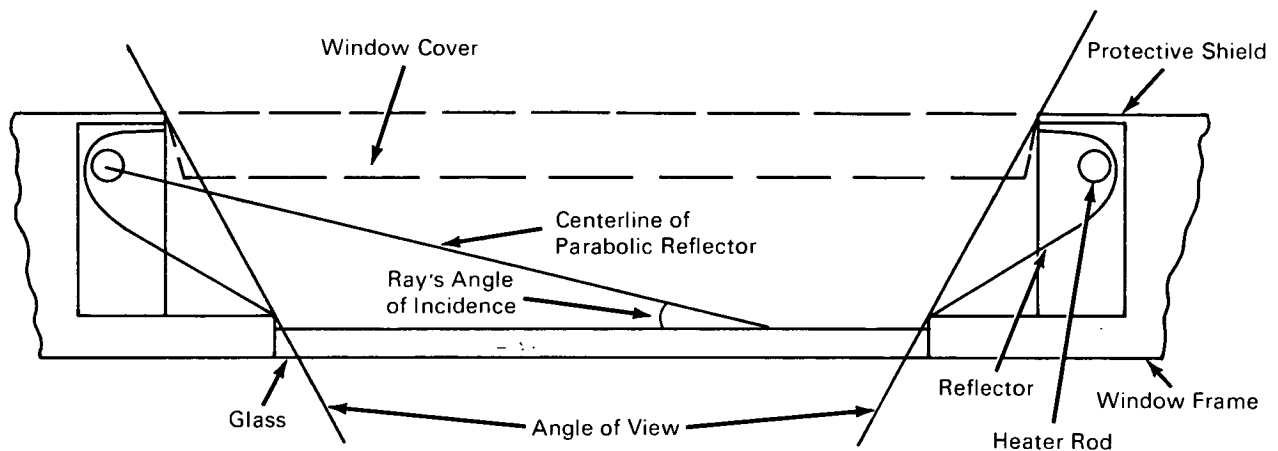


Figure 1. Transverse Section of Heated Window

Highly efficient windows have been designed which are single-pane, uncoated, and particularly suitable for the most accurate photography. These windows could be used in special telescopes and cameras for oceanographic and related studies.

Windows induce condensation when they become cold. Multipane windows reduce transmission of light, increase unwanted reflections, and permit formation of deposits on the enclosed surfaces—products of outgassing from sealing compounds. Coating of panes filters light significantly.

A single-pane window has two opposed rod heaters, with reflectors, mounted outside and beside it (Figs. 1 and 2). Electrically powered to a temperature of about 500°F the rods direct at the pane infrared rays of long wavelength. About 35% of the energy consumed by the rods reaches the panes; about 25% of this is radiated directly by the rods, while about 75% is reflected by the reflectors. Windows can be heated to fairly

even temperatures for prevention of condensation; a maximum temperature difference of about 16°F is predicted for one design of a spacecraft's window.

Tests of a simulated window in a partial-vacuum chamber have confirmed these predictions and the ability of glass to absorb infrared energy at low angles of incidence. The window is highly absorptive of infrared rays while its transmission of shorter-wavelength visible and near-visible portions of the spectrum is very efficient; thus it acts like a black plate toward infrared energy and like an open area for the useful wavelengths.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: TSP70-10324

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

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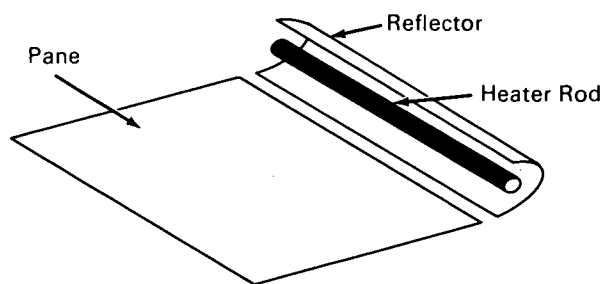


Figure 2. View of Half Window; Schematic